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50X1-HUM

COUNTRY USSR (Moscow Oblast)

REPORT

SUBJECT High Melting Point Metals Research and Development at Elektrozavod, Moscow

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A four-page report on high melting point metals research and development at the Moscow Elektrozavod /Moscow Electric Bulb Plant No. 6327

departments: the picture tube department, the miniature and subminiature tube department, the experimental plant attached to the department for high melting point metals, and the department for high melting point metals. 50X1-HUM

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: High temperature metals R&D and technology at Elektrozavod 50X1-HUM
Moscow. 31 July 61

SECRET

1) Elektrozavod Moscow departments:

a) picture tube department tube
b) miniature and subminiature department
c) the experimental plant (Versuchswerk) which is attached to the department for high- temperature metals
d) the department for high temperature metals
2) Mme Ipatova, chief of the metals research section on R&D and development trends.
3) This report will deal with:
a) R&D matters and development trends
b) the experimental plant
c) the department for high temperature metals.
4) R&D and development trends

Emphasis is placed on high temperature alloyed metals whereby tungsten, molybdenum, zirconium, tantalum and niobium are alloyed.

Great interest exists in tungsten and molybdenum alloyed with rare earths. Particular attention is paid to tantalum , niobium and hafnium. 50X1-HUM

A metal vaporization installation has been constructed but is not operating yet. One of the major tasks of the near future is the plating of metals by the metal evaporization (Metallverdampfung) method.

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[redacted] work is conducted on the kinetics of powder reactions. 50X1-HUM
Too many unclarities still exist relative to the reduction of MoO_3. Goal of the 50X1-HUM
investigation is to determine whether a uniform starting material (Ausgangsmaterial) with good reactive properties can be produced for sinter-metallurgical purposes. During the production of molybdenum trioxide (MoO_3) one still has not succeeded to control the following factors: grain size, grain shape, grain dispersion, surface size (Oberflächengrösse) and the fine structure of the surface (Oberflächenfeinstruktur). Ipatova and her staff are engaged to develop a measuring method which makes it possible to determine all the factors acting during the reduction of MoO_3 by means of hydrog
A measuring installation has been constructed combining an analysis scale (Analysenwaage with a thermal balance (Thermowaage) which registers automatically.
At certain temperatures and at a certain time periods and clearly characterized starting materials the powder grain shows certain physical properties like scale resistance, density and conductivity. 50X1-HUM
Similar experiments are being conducted also at the VEB Berliner Glühlampenwerk. 50X1-HUM
[redacted] the Soviets claim to have discovered additional properties besides scale resistance, density, conductivity etc. [redacted]
[redacted]

5) The experimental plant attached to the department for high-temperature metals
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[redacted] machinery and equipment : vacuum furnaces, drawing machines (wire drawing), rolling mills, rolling mills for foil (Folienwalzen), duo train (Duowalzwerk), test and measuring devices for scale resistance (Zunderfestigkeit), strain gauges (Dehnungsmesser), deflectometers (Biegemesser). The machines were either of East-German (Stock. Leipzig) [redacted] origin
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[redacted]

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6) department for high temperature metals

Thisdepartment comprises all the typical powder-metallurgical sections. tungstic acid is supplied by a chemical plant in the Caucasus (the plant OrDhkhonokidze ?). the Soviets had found a rather elegant method for the precipitation of the tungstic acid. They have constructed a boiler in the middle of which is a porcelain insert. A rubberized stir agitates the acid in the porcelain container. The boiler is heated from below. The NH_3 escapes and the cristallizate remains. It is not a precipitation but rather a cristallization. The cristallizate is heated (verglüht) in a "Muffelofen". The heating temperature depends on the use of the product. It is claimed that parasalt (Parasalz) becomes more fine-grained if it is heated for a longer period and coarse grained if heated for a shorter period. Then comes the reduction. After the reduction the pressing (compacting) . At the pressing section nothing had been changed even Mo is still presintered. At the hammering section (Hämmerei) an inproportionate amount of waste is produced. there exist difficulties in rolling tungsten sheetbelow 0.1 mm. Elektrosavod is also having difficulties in producing Mo foil below 30 mu. Some of the tungsten sheet had a 45 degree of brittleness. In a special section formed parts are produced from a tungsten- molybdenum alloy. Some of the formed parts looked like troughs, some were containers0.50 cm x 0.50 cm x 0.20 cm with an approximate thickness of 2.5 cm. Apparently complicated formed parts are not produced from high-temperature metal. the density (Dichte) of these formed parts was unsatisfactory. large dimensions of the gas furnaces for the sintering of the formed parts. these furnaces generate temperatures up to 2100 ^{o} C. the Ta production section. It has a sheet rolling mill which produces Ta sheet approx. 35 cm wide and 1.60 long. Rolling speed is approx. 20 m/min. The rollers are not cooled . The sheet is cold rolled. The sintering of the pressed rods takes place under vacuum. The sinter bells (Glocken) are of iron. At the side of the bell is an inspection window where with the help of a normal pyrometer the temperature of TA rods is controlled. The sintering time is read from a large clock.

The Ta production has not the same high technical level as in the GDR. The Ta sheet produced by Elektrosavod is more brittle than the one produced in the GDR . The latter has started a small lot production of Ta sheet. The VEB Berliner Glühlampenwerk produces the Ta powder which is melted in an arc light furnace of the research institute for non-ferrous metals in Freiberg/Saxony. The Ta ingots are sent to the

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VEB Berliner Glühlampenwerk which conducts experiments on the workability of the material. The Ta sheet is used by the VEB Kondensatorenwerk Gera (capacitor plant).

At the physical chemical section (headed by Kotlya) of the department for high temperature metals [redacted] some new equipment [redacted]. The section has a new electron microscope of Soviet manufacture (it already has a field emission electron microscope [redacted] and a new X-ray camera.

[redacted] a number of persons of the R&D department had been transferred to rocket development centers.

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